

**WORLDWIDE EMERGING ENVIRONMENTAL ISSUES AFFECTING THE U.S. MILITARY**  
**Subcontract No: 1048, LMI Task No: MAN0B.04, for the U.S. Army Environmental Policy Institute****FEBRUARY 2011 REPORT**

Note to Readers: Pages 1-12 comprise the summary and analysis of this report. Expanded details for some items are in the Appendix beginning on page 13.

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## **Item 1. Climate Change, Development, and Security Top International Agenda**

### **1.1 Security Council Debate on Addressing Non-Traditional Security Aspects**

The UN Security Council session of February 11, 2011, focused on the links between security, climate change, and development. The UN Secretary-General, Ban Ki-moon, stated, “Nine of the ten countries with the lowest Human Development Indicators have experienced conflict in the last 20 years.” He went on to say that while development and social aspects have gradually come to be considered in peace building strategies, focus should increase, “...on the climate change - security - development nexus”, and “We cannot achieve security without securing energy and managing climate risks.” The concept paper “The maintenance of international peace and security: the interdependence between security and development”, distributed to Council members prior to the meeting, notes the Council’s awareness of the important impact of this interdependence since the late 1990s. Countries’ statements citing economic factors affecting conflict included aspects such as loss of livelihoods, illegal exploitation of minerals, and climate change. France gave examples of how development, climate change and food security fuel conflict, noting that they will be a priority for the country’s G-20 chairmanship. [Related item: *Germany to Propose Adding Climate Change to UN Security Council Agenda* in December 2010 report.]

#### **Military Implications:**

The military should continue to explore how its R&D, logistics, and training capacities can work with others to make their development efforts more effective. It should also expand liaison where possible to apply its capacities to mitigate and prepare for adaptation to climate change. Military personnel involved in UN peacekeeping and military-to-military planning and training should anticipate increased requirements for assessing and addressing non-traditional factors as part of the strategies for conflict prevention and peacebuilding.

#### **Sources:**

Security Council Presidential Statement Stresses Need to Consider Economic, Social as well as Political Factors in Maintaining International Peace, Security

<http://www.un.org/News/Press/docs/2011/sc10172.doc.htm>

New York, 11 February 2011 - Secretary-General’s remarks to the Security Council thematic debate on “Interlinkages between Peace, Security and Development”

<http://www.un.org/apps/sg/sgstats.asp?nid=5086>

The maintenance of international peace and security—the interdependence between security and development

<http://www.securitycouncilreport.org/atf/cf/%7B65BFCF9B-6D27-4E9C-8CD3-CF6E4FF96FF9%7D/IPS%20S%202011%2050.pdf>

### **1.2 UNEP Governing Council and Global Ministerial Environmental Forum Focused on Transition to Green Growth**

The 26<sup>th</sup> session of the UNEP Governing Council/Global Ministerial Environment Forum was held in Nairobi, Kenya, February 21-24, 2011. The ministerial consultations focused on emerging policy issues in preparation for the “Rio 2012” Conference on Sustainable Development. Several countries called for changes to the current economic system while Finland said it’s working on indicators to replace GDP accounting methods. Countries also pledged support for the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. The UNEP report “Towards a Green Economy: Pathways to Sustainable Development and Poverty

Eradication,” released at the Forum, asserts that an investment of 2% of global GDP (\$1.3 trillion) per year into ten key sectors could trigger “greener, smarter growth,” removing the inherent risks and crises associated with the current “brown economy” model. Investing about 1.25% of global GDP per year in energy efficiency and renewable energies could cut global primary energy demand by 9% in 2020 and close to 40% by 2050. Transition to a Green economy is also the theme of UNEP’s Year Book 2011.

**Military Implications:**

Results of UNEP’s Forum and preparations for Rio+20 conferences should be reviewed for opportunities to further implement the Army Strategy for the Environment.

**Sources:**

26th session of the UNEP Governing Council/Global Ministerial Environment Forum  
<http://www.unep.org/gc/gc26/>

Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication  
<http://www.unep.org/greenconomy/>

UNEP Year Book 2011: Emerging Issues in Our Global Environment  
<http://www.unep.org/yearbook/2011/>

## **Item 2. Middle East Protests and Oil Prices Increase Energy Security Concerns**

Energy security concerns around the world are increasing as the scope and spectrum of the protests started in the Middle East at the beginning of 2011 are expanding. The political turmoil could further affect the living standards in the region, fuelling tension in an already conflict-prone region. Since the beginning of the protests, the price of Brent (a specific North Sea crude) has remained over \$100 per barrel (on February 23<sup>rd</sup> reaching \$111/barrel), while West Texas Intermediate is over \$97 per barrel. Extended interruptions in oil supplies from these countries would probably drive up prices further. Unreliable production and exportation of oil from the region would cause greater demand on oil supplies from the North Sea and Africa. In January 2011, Russia (already the leading producer of oil) signed a deal with British Petroleum to begin drilling for oil in the Arctic Ocean.

**Military Implications:**

The development of strategies and of a global framework for addressing energy security should accelerate. Meantime, DOD’s programs of Strategic Environmental Research and Development (SERDP) and Environmental Security Technology Certification (ESTCP) should intensify efforts for improving energy efficiency and diversify energy technologies and sources for reducing oil-dependence.

**Sources:**

EU registers first energy shock from Libya unrest  
<http://euobserver.com/9/31859/?rk=1>

Oil pressure rising  
[http://www.economist.com/blogs/newsbook/2011/02/arab\\_worlds\\_unrest\\_and\\_oil\\_prices](http://www.economist.com/blogs/newsbook/2011/02/arab_worlds_unrest_and_oil_prices)

Western oil firms react to Libya crisis  
[http://www.upi.com/Science\\_News/Resource-Wars/2011/02/21/Western-oil-firms-react-to-Libya-crisis/UPI-20681298317375/](http://www.upi.com/Science_News/Resource-Wars/2011/02/21/Western-oil-firms-react-to-Libya-crisis/UPI-20681298317375/)

Russia Embraces Offshore Arctic Drilling

[http://www.nytimes.com/2011/02/16/business/global/16arctic.html?\\_r=1&partner=rss&emc=rss](http://www.nytimes.com/2011/02/16/business/global/16arctic.html?_r=1&partner=rss&emc=rss)

### **Item 3. Environmental Security Proposed as Focus for US-China Military Strategic Trust**

Prior to his Washington visit, Chinese President Hu Jintao met with U.S. Defense Secretary Robert Gates in Beijing and urged the two militaries to deepen strategic trust. Given the internal environmental problems of China and the emerging international consensus on the importance of environmental security, the Millennium Project talk for the Army Environmental Policy Institute's Sustainability Lecture Series recommended that a key focus of such strategic trust should be environmental security.

#### **Military Implications:**

Environmental Security should be put forward through the appropriate government channels as a focus to develop US-China military strategic trust.

#### **Sources:**

Chinese president meets U.S. defense chief, urges deeper strategic trust

<http://www.china-embassy.org/eng/gdxw/t785145.htm>

International Environmental Security Briefing February 23, 2011

<http://www.millennium-project.org/millennium/presentations.html>

### **Item 4. South Korea Releases National Chemicals Control Basic Plan**

The South Korean Ministry of Environment has released the National Chemicals Control Basic Plan. This is in support of the UN's sustainable chemical control rules under the 2006 Strategic Approach to International Chemicals Management (SAICM). By 2020 the Plan will expand the national toxicity information database to cover 80% of the current 43,000 chemical substances known to be in circulation. Nanomaterials are among priority chemicals that will be subject to in-depth hazard assessment, exposure analysis, and safety studies.

#### **Military Implications:**

Military personnel with related environmental responsibilities in South Korea should review the Plan to prepare for compliance with future regulations. It is also fair to speculate that South Korea's toxicity database will support improved and strengthened international regulation of chemicals.

#### **Source:**

South Korea Includes Nanosubstances in Ten-Year Plan

<http://nanotech.lawbc.com/2011/02/articles/international/south-korea-includes-nanosubstances-in-tenyear-plan/>

### **Item 5. China Plans to Curb Heavy Metal Pollution**

China is the largest producer and user of lead in the world. Its environmental protection agency is considering tougher environmental regulations to curb heavy metal pollution. The consequences of widespread industrial contamination and pollution accidents have been rising for the past five

years and are expected to worsen over the next five, warns China's Greenpeace. Most notable are contamination of large quantities of rice with heavy metals like cadmium, and lead poisoning (mostly of children), which began triggering protests.

**Military Implications:**

The new safeguards might impact the supply and/or price of lead. Relevant military personnel and contractors should consider the potential consequences and prepare accordingly. Also, procurement personnel should be alert to the possibility of various food contaminations and ensure rigorous testing.

**Sources:**

China Plans To Rein In Heavy Metal Pollution

<http://www.reuters.com/article/2011/02/22/us-china-metal-pollution-idUSTRE71L2IC20110222>

China rice laced with heavy metals: report

<http://www.physorg.com/news/2011-02-china-rice-laced-heavy-metals.html>

## **Item 6. Technological Advances with Environmental Security Implications**

### **6.1 New Global Network of 100 Stations to Measure GHG Emissions**

The Earth Network and the Scripps Institution of Oceanography will establish a global network of GHG-measuring stations over the next five years. The network will have 50 stations in the U.S. and 50 in other countries. The observations will be made using a cavity ring-down spectroscope from Picarro of Sunnyvale CA. It will compare the behavior of laser beams passing through two chambers, one empty and one air-filled; the measurement is accurate within a few parts per billion (ppb).

**Military Implications:**

The Environmental Security Technology Certification Program should consider using the data provided by the network for assessing projects' priorities and success after completion. The network could also support enforcement of environmental regulations and eventually liability and redress actions.

**Sources:**

Earth Networks

<http://www.earthnetworks.com/>

New global network to precisely measure emissions

<http://www.washingtonpost.com/wp-dyn/content/article/2011/01/11/AR2011011107140.html>

### **6.2 Silicone Greatly Enhances TiO<sub>2</sub> Catalytic Sterilizing Effect**

Chemistry Prof. Andrew Barron and colleagues at Rice Univ. have reported discovering that adding a carefully chosen amount of silicone to the viral disinfecting catalyst TiO<sub>2</sub> improves its performance more than threefold, by changing its UV absorption.

**Military Implications:**

This development should be thoroughly investigated, as it would greatly improve the performance of TiO<sub>2</sub>-based water purification systems and antiseptic surface coatings.

**Source:**

Virus killer gets supercharged

[http://www.eurekalert.org/pub\\_releases/2011-01/ru-vkg011111.php](http://www.eurekalert.org/pub_releases/2011-01/ru-vkg011111.php)

### **6.3 Magma-fed Geothermal Sources Promise Major Improvement**

The Iceland Deep Drilling Project has announced that drilling hydrothermal wells into magma intrusions provides greater geothermal energy than drilling into weakly heated rock. The geothermal field at China Lake, California produces approximately 270 MW from about 100 wells in production depths up to 12,000 feet and relatively low temperatures up to 350°F. The magma-fed geothermal unit in Iceland at 6,900 feet encountered high pressure dry steam at 750°F, which they estimate could produce 25 MW of electricity from one well alone. This discovery substantially expands the possible significance of geothermal power as an alternative energy source.

**Military Implications:**

The military should explore this option and where it could be applied to provide carbon-free energy.

**Sources:**

Iceland Volcano Drilling Suggests Magma Could Become Source of High-Grade Energy

<http://www.sciencedaily.com/releases/2011/02/110216123545.htm>

Origin of a rhyolite that intruded a geothermal well while drilling at the Krafla volcano, Iceland

<http://geology.gsapubs.org/content/39/3/231.abstract?sid=40206649-75ee-4829-840e-b0fc7bfbc21b>

## **Item 7. Updates on Previously Identified Issues**

### **7.1 Waste Management Improvements**

#### **7.1.1 EU to Introduce Stricter Regulations for E-Waste Management**

The European Parliament has adopted amendments for strengthening the Directive on waste electrical and electronic equipment (WEEE Directive). The proposed new rules require that from 2016 on, depending on the category, 85% of WEEE be recovered and 50-75% recycled, while 5% is to be prepared for re-use. The Directive also sets producer and consumer responsibilities, and holds the exporter responsible for the legality of WEEE export and treatment in developing countries. The European Council is expected to debate the proposal in March 2011. [Related item: *Hazardous E-waste Grows as Major Environmental Problem* in November 2010 report.]

**Military Implications:**

The WEEE Directive contains language exempting “Equipment which is necessary for the protection of the essential interests of the security of Member States, including arms, munitions and war material intended for specifically military purposes.” Nevertheless, depending on the SOFA, military and its civilian contractors on EU territory should read the directive and be prepared to comply appropriately with the new amendments.

**Sources:**

Waste electrical and electronic equipment. Texts adopted, Thursday, 3 February 2011 – Brussels

<http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P7-TA-2011-0037+0+DOC+XML+V0//EN&language=EN>

MEPs demand better e-waste management

[http://www.europarl.europa.eu/pdfs/news/expert/infopress/20110203IPR13097/20110203IPR13097\\_en.pdf](http://www.europarl.europa.eu/pdfs/news/expert/infopress/20110203IPR13097/20110203IPR13097_en.pdf)

#### 7.1.2 International Partnership to be Established for Improving Local Waste Management

The CSD-19 Intersessional Conference on Building Partnerships for Moving towards Zero Waste was held February 16-18, 2011, in Tokyo, Japan. It concluded that the transition to a zero-waste society is key to achieving green growth and sustainable development. The conference also highlighted the need for building a platform to foster international cooperation and explore new opportunities, including reusing/convert wastes as resources. Delegates also agreed to establish the International Partnership for Expanding Waste Management Services of Local Authorities (IPLA) to serve as a clearinghouse of best practices and boost waste management capacity at local and regional levels. IPLA will be officially launched at CSD-19 to be held in May 2011. [Related item: *First Joint Meeting of the Main Conventions on Hazardous Chemicals to Improve International Environmental Governance* in February 2010 environmental security report.]

#### **Military Implications:**

The military should be prepared to appropriately comply with increasingly stricter waste-management regulations likely to increase at all levels — from international to local.

#### **Sources:**

CSD Intersessional Conference on Building Partnerships for Moving towards Zero Waste

[http://www.uncrd.or.jp/env/spc/docs/csd19\\_concept\\_note.pdf](http://www.uncrd.or.jp/env/spc/docs/csd19_concept_note.pdf)

CSD-19 website: [http://www.un.org/esa/dsd/csd/csd\\_csd19.shtml](http://www.un.org/esa/dsd/csd/csd_csd19.shtml)

Result of the United Nations meeting concerning waste management (in Japanese)

<http://www.env.go.jp/press/press.php?serial=13491>

#### **7.2 EU to Ban Six Toxic Chemicals under the REACH Program**

The EU has selected the first six substances to be listed in Annex XIV of the REACH (Registration, Evaluation, Authorization and Restriction of Chemicals) program. The chemicals' use or commercialization is banned unless special authorization is obtained. Three phthalates, a flame retardant, a synthetic musk, and a compound used in epoxy resins and adhesives are to be phased out from 2014 to 2015. [Related items: *EU Updates the REACH System, and WEEE and RoHS Directives* in December 2008 environmental security report.]

#### **Military Implications:**

[Same as previous on this issue] EC efforts to enforce environmental regulations will trigger further changes in EU Member States' national legislation. Military stationed in the EU countries should review compliance with EU environmental regulations, as applicable.

#### **Sources:**

Chemicals/REACH: six dangerous substances to be phased out by the EU

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/11/196&format=HTML&aged=0&language=EN&guiLanguage=en>

First Chemicals Banned In European Union

<http://pubs.acs.org/cen/news/89/i08/8908news2.html>

### **7.3 New Zealand Establishes Vast Marine Reserves around Subantarctic Islands**

The government of New Zealand is establishing three huge marine reserves totaling 1,680 square miles in the Subantarctic Islands, covering Antipodes Is., Campbell Is., and the Bounty Islands. [Related item: *New Protected Areas Proposed in the Pacific* in November 2010 environmental security report.]

#### **Military Implications:**

The military should assess how the designation of the new marine reserves impacts military operations and ensure appropriate compliance.

#### **Source:**

Subantarctic Islands to become marine reserves

<http://www.scoop.co.nz/stories/PA1101/S00154/subantarctic-islands-to-become-marine-reserves.htm>

### **7.4 New Frameworks for Securing Supply of Rare Earth Elements**

#### 7.4.1 Japan Suggests "Triangular cooperation" for Addressing Rare Earth Supply

Keiichi Kawakami of the Japanese Ministry for Industry has suggested that Japan, the U.S., and the EU build a “triangular cooperation” network to join forces for developing strategies to diversify supply sources and develop substitutes, as well as to encourage China to, “...establish quotas sufficient to prevent adverse effects on the world industrial supply chain.” He made the suggestion at the European Parliament, while presenting Japan’s Rare Earth Elements strategy, adopted in October 2010, after China stopped shipments to Japan over a territorial dispute. U.S. held bilateral meetings with Japan and the EU in November and December 2010 respectively.

#### 7.4.2 China to Increase the Framework Related to Rare Earth Elements Production and Supply

China controls over 90% of present rare earth supply. It has been gradually reducing export quotas since 2005 and might even become a major importer, due to its high level of consumption of these materials. Meantime, China’s State Council announced that over the next five years it will establish and improve the supervision regulations framework and standards that relate to rare earth mining, processing, and export, to protect the environment and resources. There are speculations that the government is planning to reduce the number of active rare earth metal mines from the current 123 to approximately 10, as well as reduce processing facilities by more than two-thirds.

#### 7.4.3 The U.S. Increasing Efforts to Secure Rare Earth Elements Supply

The report *Energy Critical Elements: Securing Materials for Emerging Technologies* by the American Physical Society and Materials Research Society offers recommendations for securing future supplies of rare earths and other elements critical to the development of new technologies to foster U.S. energy independence. Similar recommendations are included in the bill “Critical Minerals and Materials Promotion Act of 2011” introduced by Sen. Mark Udall, of Colorado on February 17, 2011 and referred to the Committee on Energy and Natural Resources. [Related item: *The Battle for Rare Earth Elements Continues* in January 2011 report.]

#### **Military Implications:**

[Similar to previous on this issue] R&D for rare earths substitutes and new sources should be accelerated. Environmental pollution aspects should be managed in pace with any acceleration, under the stewardship principle as included in the Army Strategy for the Environment.

**Sources:**

EU, US, Japan should cooperate on rare earth supply

<http://www.euractiv.com/en/sustainability/eu-us-japan-cooperate-rare-earth-supply-news-501917>

China to further regulate rare earth exports: MOC spokesman

[http://english.gov.cn/2011-02/17/content\\_1805274.htm](http://english.gov.cn/2011-02/17/content_1805274.htm)

New rules regulate rare earth industry

[http://www.chinadaily.com.cn/usa/business/2011-02/18/content\\_12041065.htm](http://www.chinadaily.com.cn/usa/business/2011-02/18/content_12041065.htm)

*Energy Critical Elements*—Developing New Technologies to Foster U.S. Energy Independence

<http://aps.org/about/pressreleases/elementsreport.cfm>

A bill to promote the domestic production of critical minerals and materials, and for other purposes

<http://www.govtrack.us/congress/bill.xpd?bill=s112-383>

## **7.5 Ecuadorian Court Fines Chevron \$8.6 Billion for Environmental Damages**

An Ecuadorian court verdict orders Chevron Corp. to pay about \$8.6 billion to Amazonian communities for environmental damage caused by oil drilling during 1964-1992. Although this is the largest compensation for its type, the plaintiffs' lawyers estimate the damage costs to around \$113 billion. Lack of a clear legal system, and liability and redress framework for environmental damage from exploitation of natural resources might keep the case unsettled for several more years. [See also *Environmental Courts and Tribunals Are Rapidly Increasing Around the World* and *The Oil Spill Likely to Initiate International Regulations Discussions and Accelerate Alternative Energy Developments* in the April and May 2010 environmental security reports.]

**Military Implications:**

This Ecuadorian case adds to other international legal actions and creates a precedent for nations ruling against international polluters and setting high damages. The ambiguity of the legal framework and the different interests involved will probably pressure the international community to establish clear legal frameworks for environmental damages caused by non-national entities. The military might not be exempted. Military legal experts should track developments.

**Sources:**

Ecuador Judge Orders Chevron to Pay \$9 Billion

<http://www.nytimes.com/2011/02/15/world/americas/15ecuador.html>

Indigenous people wins ruling against Chevron

[http://www.npaid.org/en/News\\_Archive/?module=Articles;action=Article.publicShow;ID=16825](http://www.npaid.org/en/News_Archive/?module=Articles;action=Article.publicShow;ID=16825)

Chevron to pay Billions in Damages, Ecuadorian Court Rules

<http://ictsd.org/i/news/biores/101288/>

Chevron, Ecuador Lawsuit

<http://www.chevron.com/ecuador/>

## **7.6 Climate Change**

### **7.6.1 Food and Water Security**

The FAO Food Price Index averaged 231 points in January 2011, the highest level since 1990, when it is backtracked. Prices of all monitored commodity groups showed strong gains, with the exception of meat, which remained constant. The World Bank's food price index is also on the rise and in January was only 3% below its 2008 peak. The Bank estimates that rising food prices have pushed 44 million more people into extreme poverty since June 2010, and warns that

global food prices have reached “dangerous levels,” which could aggravate political and social conditions in fragile regions. Additionally, severe weather conditions in China, the world’s largest wheat producer, affected 12.75 million (of a total 35 million) acres of wheat fields. If China, which has the highest foreign exchange reserves, begins importing large quantities of food, international prices might rise even higher, with serious impact on the rest of the world.

A five-point action plan developed by FAO to help countries cope with food price volatility includes creating a multilateral mechanism to improve transparency of food markets.

The FAO report, *Making Integrated Food-Energy Systems (IFES) Work for People and Climate: An Overview*, presents examples of approaches that integrate food and energy crops. The paper describes two types of IFES: a) food and biomass for energy are grown on the same land, and b) the use of agro-industrial technology that allows agricultural byproducts to be used through gasification or anaerobic digestion. It underscores that integrating crops can also be an effective climate change mitigation approach.

South Korea announced plans for creating a national body for addressing food security issues, and establishing its own grain-trading company in Chicago by mid-2011, trying to mitigate the impact of global food price volatility.

#### 7.6.2 Melting Glaciers and Sea Ice

The Arctic’s air temperatures were 2°-6°C (4°-11°F) above normal in January 2011, and the extent of ice was the lowest for the month since the beginning of satellite records. Ice coverage for the month declined by roughly 10% in three decades (see graph in the [Appendix](#)).

Peru’s Huaytapallana Mountain glacier lost 50% of its surface ice between June 1983 and August 2006, announced Peruvian officials, reinforcing concerns over threats to fresh water resources. A World Bank report of 2009 said that Peru’s glaciers have shrunk by 22% over the past 35 years, leading to a 12% loss in the amount of fresh water reaching the coast, where most of the country’s population lives. The report warned that Andean glaciers and permanent snowcaps could disappear in 20 years.

#### 7.6.3 Rising Seas Level

Using data from the U.S. Geological Survey, a study by the University of Arizona maps the U.S. coast showing in detail where and how much coastal land could be lost if global sea levels rise by about 3 feet by 2100. The study found that an average of 9% of the land in the 180 coastal cities is threatened, with the southern Atlantic coast and the Gulf of Mexico most affected.

#### 7.6.4 Migration

The Asian Development Bank project on Policy Options to Support Climate-induced Migration aims to enhance regional preparedness for migration triggered by climate change. This project considers the assumption that increased occurrence and intensity of extreme weather conditions will force a growing number of people to migrate. It is the first international initiative addressing climate-induced migration in Asia and the Pacific to generate policies and finance recommendations. Also as part of the project, the report, *Climate Change and Migration in Asia and the Pacific*, expected to be published in March 2011, will highlight “hotspots” and potential migration management options for improved adaptation and opportunities.

### 7.6.5 Adaptation

The briefing note, *Strengthening Climate Change Adaptation Through Effective Disaster Risk Reduction*, by the UN International Strategy for Disaster Reduction (UN/ISDR) presents climate risk reduction strategies and an assessment of how managing risks can reduce costs. One of the key messages is that disaster risk reduction and adaptation should be included in national development planning.

On February 9, 2011, the UN General Assembly held its first debate on disaster risk reduction. The debate included two panels: “Invest Today for a Safer Tomorrow,” and “Addressing the Challenges of Disaster Risk in Urban Settings.” The outcomes will inform the third session of the biennial Global Platform for Disaster Risk Reduction to be held May 8-13, 2011, in Geneva, Switzerland.

The World Resources Institute, in collaboration with UNEP, UNDP, and the World Bank, have launched the World Resources Report website in an open form that invites expert views to be considered for the findings and recommendations of the 2011 edition of the World Resources Report to be published in April 2011. This report aims to provide guidance on mainstreaming climate change risks into planning and policies across sectors such as agriculture, electricity production, and forestry and water management. The World Resources Report website is found below under Sources.

#### **Military and Security Implications:**

[Same as previous on this issue] The military should identify all its resources and programs for reducing GHGs and responding to effects of climate change, update information continuously, forecast how it might be called upon for both mitigation and adaptation, and perform a gap analysis in anticipation of future requests. International discourse over climate change is increasing the development of international policies and strategies to mitigate and adapt to climate change.

**Sources:** (see an expanded list in the [Appendix](#))

FAO Food Price Index

<http://www.fao.org/worldfoodsituation/wfs-home/foodpricesindex/en/>

U.N. Food Agency Issues Warning on China Drought

[http://www.nytimes.com/2011/02/09/business/global/09food.html?\\_r=1](http://www.nytimes.com/2011/02/09/business/global/09food.html?_r=1)

Reducing poverty by growing fuel and food

<http://www.fao.org/news/story/en/item/51165/icode/>

South Korea President Calls For National Food Procurement Body

<http://planetark.org/wen/61124>

National Snow and Ice Data Center, Arctic Sea Ice News & Analysis

<http://nsidc.org/arcticseaicenews/>

Climate change halves Peru glacier: official

<http://www.google.com/hostednews/afp/article/ALeqM5htSvBVTDFNBgjgNUEFs1z2pEPuw?docId=CNG.867dcb3d94702f9df32e0fdb6185a98.1011>

Rising Seas Threaten 180 U.S. Cities By 2100: Study

<http://planetark.org/wen/61245>

Climate-induced Migration

<http://www.adb.org/SocialDevelopment/climate-migration/>

Top United Nations Officials Stress Need to Invest in Advance Planning, Sound Prevention as General Assembly Holds First Debate on Reducing Disaster Risk

<http://www.un.org/News/Press/docs//2011/ga11048.doc.htm>

World Resources Report Website  
<http://www.worldresourcesreport.org>.

### 7.7 Nanotechnology Safety Issues

More detailed descriptions of the following nanotechnology issues are in the [Appendix](#)

- Netherlands to require nanotech development to devote at least 15% of the investment to risk analyses ([more](#))
- Joint US/UK consortium, Nanomaterial Bioavailability and Environmental Exposure (Nano-BEE), to develop nanotech risk-management tools ([more](#))
- National Nanotechnology Initiative Releases 2011 Strategic Plan ([more](#))
- A new toxicology of sophisticated materials required for the nano future ([more](#))
- The paper *How Safe Is Nano? Nanotoxicology: An interdisciplinary challenge* addresses the reliability of nanotech toxicity studies ([more](#))
- The paper *Still more questions than answers on nanotechnology in food* says that lack of information is an impediment to public acceptance of nanotech ([more](#))
- The new EC-funded NANOCHANNELS is dedicated to engaging European citizens in the nanotech debate ([more](#))
- *Nanowerk Spotlight* published a review of nanotechnology and public opinion ([more](#))
- More Regulation Would Benefit Nanotech Development, says a recent post on an Environmental Defense Fund blog ([more](#))
- NanoHealth and Safety Center created at Univ. at Albany ([more](#))
- Zimbabwe has adopted a National Nanotechnology Programme ([more](#))
- Nanotech Conferences to Examine Current and Future Problems ([more](#))  
*The Biggest Issues for the Smallest Stuff: Regulation and Risk Management of Nanotechnology*, 21 March 2011 in Phoenix AZ (<http://lsi.law.asu.edu/nanoregulation/>)  
*Bridging NanoEHS Research Efforts - a joint US-EU Workshop*, March 10-11, 2011 (<http://www.nano.gov/html/meetings/us-eu/index.html>)  
The International Conference on Frontiers of Characterization and Metrology for Nanoelectronics 2011, 23-26 May 2011, Grenoble, France ([www.nist.gov/pml/semiconductor/conference](http://www.nist.gov/pml/semiconductor/conference))

## Item 8. Reports and Information Suggested for Review

### 8.1 Evaluation of BioWatch (Biowarfare Detection) System and Upgrades

*BioWatch and Public Health Surveillance: Evaluating Systems for the Early Detection of Biological Threats: Abbreviated Version* by the National Academies is an evaluation of the federal monitoring system for rapid detection of specific biological agents during a biological attack. The report is a comprehensive evaluation of the cost-effectiveness of the current BioWatch program and the planned new generation of BioWatch devices, while also assessing whether BioWatch and traditional infectious disease surveillance systems are redundant or complementary.

**Military Implications:**

Military personnel concerned with biowarfare and the environment should consider reviewing this publication for new information, as well as for providing feedback for continuous improvement of the BioWatch program and devices.

**Source:**

*BioWatch and Public Health Surveillance: Evaluating Systems for the Early Detection of Biological Threats: Abbreviated Version*

[http://books.nap.edu/catalog.php?record\\_id=12688#description](http://books.nap.edu/catalog.php?record_id=12688#description)

**8.2 Earthquakes and Corruption**

The study “Corruption kills” by Nicholas Ambroseys and Roger Bilham, published in the journal *Nature* (volume 469), assesses the link between governance and casualties due to building structures and quality. It shows that in impoverished areas, where corruption is rampant, substandard building materials are routinely used in order to cut costs and gain greater profits. This places the people who live and work in those buildings at risk in the event of a natural disaster. Using data from the last 30 years, the authors found that 83% of deaths that occurred from building collapses in earthquakes happened in countries where corruption is an issue. They contend that “there is statistical support for widespread anecdotal evidence of a correlation between corruption and loss of life in earthquakes” and that this data supports widely-voiced opinions that the number of deaths resulting from earthquakes is likely to correspond to the ability to afford quality building materials and enforce standards for building earthquake-resistant structures, rather than the geology of the area.

**Military Implications:**

The study highlights that improved governance (including reducing corruption) should be an integral part of disaster prevention and preparedness programs. When involved in reconstruction, and/or when possible, the military should exercise increased surveillance of the building materials’ quality and work execution to reduce later vulnerability to natural disasters and creation of excess casualties as much as possible.

**Sources:**

Ambroseys, Nicholas & Roger Bilham (13 January 2011). “Corruption kills.” *Nature* 469 <http://www.nature.com/nature/journal/v469/n7329/full/469153a.html>.

Tackle corruption to cut earthquake deaths

<http://www.scidev.net/en/agriculture-and-environment/natural-disasters/opinions/tackle-corruption-to-cut-earthquake-deaths.html>

## APPENDIX

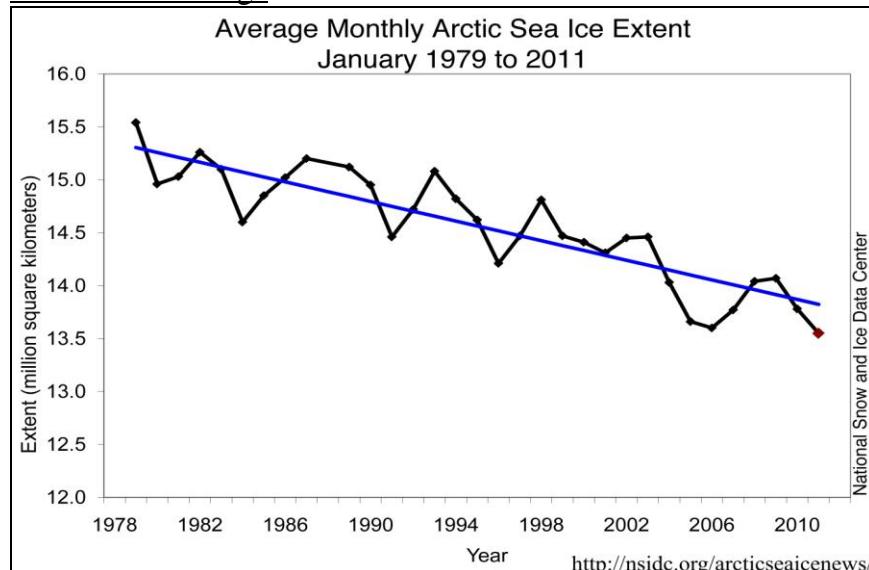
### Reference Details

This Appendix contains expanded background information on some items.

### Item 7. Updates on Previously Identified Issues

#### 7.6 Climate Change

##### Arctic Ice Coverage



##### Sources: (a more expanded list)

###### 7.6.1 Food and Water Security

FAO Food Price Index

<http://www.fao.org/worldfoodsituation/wfs-home/foodpricesindex/en/>

UN agency on 'red alert' as soaring food prices threaten millions of world's poorest

<http://www.un.org/apps/news/story.asp?NewsID=37547&Cr=food+prices&Cr1>

A severe winter drought in the North China Plain may put wheat production at risk

<http://www.fao.org/docrep/013/al975e/al975e00.pdf>

World food prices reach new historic peak

<http://www.fao.org/news/story/pt/item/50519/icode/en/>

World Bank chief cautions over food prices

<http://www.trust.org/alertnet/news/zoellick-g20-must-address-increasing-global-food-demand-and/>

Africa, Caribbean urged to brace for food price shocks

<http://www.trust.org/alertnet/news/analysis-africa-caribbean-urged-to-brace-for-food-price-shocks/>

Cost of Feeding World's Poor Leap

[http://online.wsj.com/article/SB10001424052748704364004576132044238148366.html?mod=dist\\_smartbrief](http://online.wsj.com/article/SB10001424052748704364004576132044238148366.html?mod=dist_smartbrief)

Nations to Expand Food Stockpiles, Boost Subsidies, Traders Say

<http://www.bloomberg.com/news/2011-02-21/surging-food-costs-mideast-unrest-may-drive-stockpile-growth-traders-say.html>

International action needed to curb food price speculation: MEPs

<http://www.foodnavigator.com/Financial-Industry/International-action-needed-to-curb-food-prices-speculation-MEPs>

G20 Communiqués

[http://www.g20.org/Documents2011/02/COMMUNIQUE-G20\\_MGM%20\\_18-19\\_February\\_2011.pdf](http://www.g20.org/Documents2011/02/COMMUNIQUE-G20_MGM%20_18-19_February_2011.pdf)

As G20 Leaders Set Deal, Geithner Criticizes China

<http://www.nytimes.com/2011/02/20/business/global/20euro.html>

Food fund promise unfulfilled

<http://www.washingtonpost.com/wp-dyn/content/article/2011/02/18/AR2011021807051.html>

U.N. Food Agency Issues Warning on China Drought

[http://www.nytimes.com/2011/02/09/business/global/09food.html?\\_r=1](http://www.nytimes.com/2011/02/09/business/global/09food.html?_r=1)

Reducing poverty by growing fuel and food

<http://www.fao.org/news/story/en/item/51165/icode/>

South Korea President Calls For National Food Procurement Body

<http://planetark.org/wen/61124>

### 7.6.2 Melting glaciers and sea ice

National Snow and Ice Data Center, Arctic Sea Ice News & Analysis

<http://nsidc.org/arcticseaicenews/>

Climate change halves Peru glacier: official

<http://www.google.com/hostednews/afp/article/ALeqM5htSvBVTDFNBgjgNUEFs1z2pEPuw?docId=CNG.867dcb3d94702f9df32e0fdb6185a98.1011>

### 7.6.3 Rising Seas Level

Rising Seas Threaten 180 U.S. Cities By 2100: Study

<http://planetark.org/wen/61245>

### 7.6.4 Migration

Climate-induced Migration

<http://www.adb.org/SocialDevelopment/climate-migration/>

Migration Due to Climate Change Demands Attention – ADB

<http://www.adb.org/Media/Articles/2011/13473-asian-climates-changes/>

### 7.6.5 Adaptation

Strengthening climate change adaptation through effective disaster risk reduction

[http://preventionweb.net/files/16861\\_ccbriefingnote3.pdf](http://preventionweb.net/files/16861_ccbriefingnote3.pdf)

Top United Nations Officials Stress Need to Invest in Advance Planning, Sound Prevention as General Assembly Holds First Debate on Reducing Disaster Risk

<http://www.un.org/News/Press/docs/2011/ga11048.doc.htm>

On the Occasion of the Informal Thematic Debate of the General Assembly on Disaster Risk Reduction

<http://www.un.org/en/ga/president/65/statements/isdr90211.shtml>

Remarks at General Assembly informal thematic debate on Disaster Risk Reduction

[http://www.un.org/apps/news/infocus/sgspeeches/statments\\_full.asp?statID=1068](http://www.un.org/apps/news/infocus/sgspeeches/statments_full.asp?statID=1068)

World Resources Report Website

<http://www.worldresourcesreport.org>.

World Resources Report Launches Initiative on Decision Making for Climate Adaptation

<http://www.wri.org/stories/2011/02/world-resources-report-launches-initiative-decision-making-climate-adaptation>

## **7.7 Nanotechnology Safety Issues**

More detailed descriptions of the nanotechnology issues

### 7.7.1 Netherlands to Require Nanotech Development to Include Risk Analysis

The Netherlands government has announced that joint public/private investments in the development of nanotechnology must devote at least 15% of the investment to risk analyses. According to nanotech.lawbc.com, a recent report found that citizens have a positive attitude about the opportunities offered by nanotech, but are concerned about the risks.

#### **Military Implications:**

This move is a sign of increasing concern by European governments about public attitudes toward nanotech risks, raising the likelihood of stricter controls in the future.

#### **Source:**

The Netherlands Will Require Nanotechnology Development to Include Investment in Risk Analysis

<http://nanotech.lawbc.com/2011/02/articles/international/the-netherlands-will-require-nanotechnology-development-to-include-investment-in-risk-analysis/>

### 7.7.2 Joint US/UK Consortium to Develop Nanotech Risk-management Tools

A new organization from the US and the UK, the Nanomaterial Bioavailability and Environmental Exposure (Nano-BEE) Consortium, is developing risk-management tools government officials will be able to use to effectively regulate nanomaterials. According to a project spokeswoman, "[R]egulators need tools that will allow them to look at a wide variety of nanomaterials and rapidly identify the most significant potential problems for a specific nanomaterial in a specific location. This [consortium] ... will model how the local environmental chemistry influences the availability of nanomaterials. We expect to see a lot of variability: What is safe in one area may be unsafe someplace else."

#### **Military Implications:**

Appropriate ES personnel should establish liaison with the consortium in order to stay informed of its findings.

**Sources:**

US, UK Join Forces for Nano Safety

<http://www.media.rice.edu/media/NewsBot.asp?MODE=VIEW&ID=15276&SnID=2013438090>

Consortium for Manufactured Nanomaterial Bioavailability & Environmental Exposure

[http://cfpub.epa.gov/ncer\\_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/9271/report/0](http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/9271/report/0)

**7.7.3 National Nanotechnology Initiative (NNI) Releases 2011 Strategic Plan**

The US National Nanotechnology Initiative (NNI) has released the 2011 NNI Strategic Plan, which states four goals: advance a world-class nanotech R/D program; foster the transfer of new technologies into products; develop and sustain educational resources, a skilled workforce, and the supporting infrastructure and tools to advance nanotech; and support responsible nanotech development. It also lays out specific objectives under each goal, “outlining concrete steps that NNI member agencies will take toward collectively achieving the NNI vision and goals”, according to nanotech.lawbc.com.

**Military Implications:**

All system program managers and EHS personnel concerned with nanotechnology should review the plan and consider the steps they need to take to meet its objectives.

**Sources:**

NNI Releases 2011 Strategic Plan

<http://nanotech.lawbc.com/2011/02/articles/united-states/federal/nni-releases-2011-strategic-plan/>

2011 NNI Strategic Plan

<http://www.nano.gov/nnistrategicplan211.pdf>

**7.7.4 A New Toxicology of Sophisticated Materials Required for the Nano Future**

A new paper notes, "...it has become ever-more important to understand how the physical form and chemical composition of these [nano] materials interact synergistically to determine toxicity.

... Research within ... [nanotoxicology] is highlighting the importance of material physicochemical properties in how dose is understood, how materials are characterized in a manner that enables quantitative data interpretation and comparison, and how materials move within, interact with and are transformed by biological systems." The paper presents "...a brief overview of the current state of the science ... , and focus on three emerging ... challenges ... that will become increasingly important over the next fifty years: identifying relevant materials for study, physicochemical characterization, and bio-interactions. "

**Military Implications:**

This paper should be reviewed by system program managers and EHS personnel for ideas on nanotech risk assessment planning.

**Source:**

The New Toxicology of Sophisticated Materials: Nanotoxicology and Beyond

<http://toxsci.oxfordjournals.org/content/early/2010/12/22/toxsci.kfq372>

**7.7.5 Scientists Review State of Nanotoxicology**

Harald F. Krug and Peter Wick of the Swiss Federal Laboratories for Materials Science and Technology have published a paper, *How Safe Is Nano? Nanotoxicology: An interdisciplinary*

*challenge*, that, according to the abstract, “...seeks to cast light on the phenomena that may occur as nanoobjects interact with cells, tissues, and organisms ... [and to] demonstrate that the many data made available on the biological effects of nanomaterials do not always come from studies that can be considered reliable.”

**Military Implications:**

This paper should be reviewed by system program managers and EHS personnel for ideas on nanotech risk assessment planning.

**Sources:**

Nanotoxicology: An Interdisciplinary Challenge

<http://dx.doi.org/10.1002/anie.201001037>

How Safe Is Nano? Nanotoxicology: An interdisciplinary challenge

<http://www.physorg.com/news/2011-01-safe-nano-nanotoxicology-interdisciplinary.html>

#### 7.7.6 More Assurance of Nanotech Safety A Factor in Public Acceptance

A new paper, *Still more questions than answers on nanotechnology in food*, raises the problem that the unanswered questions on nanotech safety, and the failure to communicate to the public the information that is available on its benefits and risks, especially in food, are obstacles to achieving consumer acceptance of the technology. The author concludes: "Achieving safe and widely accepted commercial uses of nanotechnology will require concerted effort across countries, Federal agencies, disciplines and sectors. Ultimately, the success or failure of nanotechnology may hinge on how and the extent that these challenges are overcome."

**Military Implications:**

These cautions should be thoughtfully considered by system program manager and EHS personnel responsible for public communication.

**Sources:**

Nanotechnology for Food Applications: More Questions Than Answers

<http://onlinelibrary.wiley.com/doi/10.1111/j.1745-6606.2010.01182.x/abstract>

Still more questions than answers on nanotechnology in food

<http://www.foodnavigator-usa.com/Financial-Industry/Still-more-questions-than-answers-on-nanotechnology-in-food>

#### 7.7.7 New EU NANOCHANNELS Project Aims to Improve Public Understanding

The new NANOCHANNELS, an EC-funded project, implemented by a consortium of nanotech, media, public communications, and educational organizations, will engage in “a dynamic programme of communication, dialogue, and engagement in issues of nanotechnology (NT) aimed at European citizens, ... [with] the overarching aim ... to build trust and achieve a social consensus in the development and implementation of nanotechnology.” The Institute of Nanotechnology will be the project’s scientific advisor and it will operate in six countries, including Israel.

**Military Implications:**

Nanotech-related EHS personnel in the European Theater should establish liaison with this effort, to exchange assistance and ideas.

**Source:**

‘It’s good to talk’: Institute of Nanotechnology participates in the Nanochannels project  
<http://www.nano.org.uk/news/1189/>

**7.7.8 Review of Nanotechnology and Public Opinion**

*Nanowerk Spotlight* recently published an article by Prof. Dietram A. Scheufele of the College of Agricultural & Life Sciences at the Univ. of Wisconsin reviewing the history and current state of public opinion about nanotechnology. He reports on two trends in public knowledge about nanotech, viz., “levels of knowledge about nanotechnology across the general population have remained fairly static in the last few years; and, there is a widening gap among education groups, with highly educated individuals showing increased learning over time, and less-educated respondents falling behind in terms of how much they know about nanotechnology.” The paper has an extensive list of references.

**Military Implications:**

The article provides insights that should be useful to personnel concerned with communicating nanotech information to the general public.

**Source:**

Nanotechnology and public opinion  
<http://www.nanowerk.com/spotlight/spotid=19819.php>

**7.7.9 Article Suggests More Regulation Would Benefit Nanotech Development**

A recent post on an Environmental Defense Fund blog suggests, “...a little regulation would have done – and still could do – the world of nanotechnology a world of good.” concluding that “A little regulation could go a long way toward restoring confidence in our ability to produce and use these emerging materials in a manner that reaps the benefits and avoids the harm they may otherwise cause.”

**Military Implications:**

EHS personnel concerned with nanotech regulation should review this article for its thoughts on regulatory policy.

**Sources:**

Regulating nanomaterials to life, not death

<http://blogs.edf.org/nanotechnology/2011/01/28/regulating-nanomaterials-to-life-not-death/>

**7.7.10 NanoHealth and Safety Center Created at Univ. at Albany**

SEMATECH, a global consortium of chipmakers, its subsidiary, the International SEMATECH Manufacturing Initiative, Inc. (ISMI), and the College of Nanoscale Science and Engineering (CNSE) of the University at Albany (SUNY Albany) have announced the creation of the world's first NanoHealth and Safety Center (NSC), at CNSE's Albany NanoTech Complex. Its initial challenges will include occupational and environmental health and safety, and resource utilization.

**Military Implications:**

Components concerned with nanotech EHS should establish liaison with the new Center, to keep informed of its work.

**Source:**

SEMATECH, ISMI and UAlbany NanoCollege partner to launch groundbreaking NanoHealth and Safety Center

[http://www.cnse.albany.edu/newsroom/newsreleases/11-02-15/SEMATECH\\_ISMI\\_and\\_UAlbany\\_NanoCollege\\_partner\\_to\\_launch\\_groundbreaking\\_NanoHealth\\_and\\_Safety\\_Center.aspx](http://www.cnse.albany.edu/newsroom/newsreleases/11-02-15/SEMATECH_ISMI_and_UAlbany_NanoCollege_partner_to_launch_groundbreaking_NanoHealth_and_Safety_Center.aspx)

**7.7.11 Zimbabwe Starts National Nanotechnology Programme**

The Zimbabwe Ministry of Science and Technology has adopted a National Nanotechnology Programme, in partnership with the Zimbabwe Academy of Sciences and the Zimbabwe Research Council, to help guide local industry in taking advantage of the emerging technology.

**Military Implications:**

EHS personnel in the region should offer their assistance to the new national nanotech program.

**Source:**

Zim Adopts Nanotechnology Programme

<http://www.newsday.co.zw/article/2011-01-27-zim-adopts-nanotechnology-programme>

**7.7.12 Nanotech Conferences to Examine Current and Future Problems**

- A conference *The Biggest Issues for the Smallest Stuff: Regulation and Risk Management of Nanotechnology* is being held 21 March 2011 in Phoenix AZ, featuring experts from government, industry, non-governmental organizations, the insurance industry and academia, who will examine recent trends and challenges in regulation and risk management of nanotechnology.

Nanotechnology regulation conference to tackle big policy questions for the small science  
<http://www.nanowerk.com/news/newsid=20166.php>

The Biggest Issues for the Smallest Stuff: Regulation and Risk Management of Nanotechnology  
<http://lsi.law.asu.edu/nanoregulation/>

- The National Nanotechnology Coordination Office will hold *Bridging NanoEHS Research Efforts - a joint US-EU Workshop* on March 10-11, 2011, to provide an open forum and engage in an active scientific discussion about nano EHS, to encourage joint US-EU programs of work that would leverage resources, and to establish communities of research practice, between key U.S. and EU researchers for near-term and future collaborations. Registration for the workshop is closed, but proceedings will be available later at [www.nano.gov](http://www.nano.gov).

National Nanotechnology Coordination Office: Bridging NanoEHS Research Efforts - a joint US-EU Workshop  
<http://www.nanowerk.com/news/newsid=20179.php>

US-EU *Bridging NanoEHS Research Efforts*  
<http://www.nano.gov/html/meetings/us-eu/index.html>

- The International Conference on Frontiers of Characterization and Metrology for Nanoelectronics 2011 (IC-FCMN 2011) will be held 23-26 May 2011 at MINATEC, an international center for micro- and nanotechnologies, in Grenoble, France.

International Conference on Frontiers of Characterization and Metrology for Nanoelectronics Set for May 23-26

<http://www.nanowerk.com/news/newsid=20181.php>

Frontiers of Characterization and Metrology for Nanoelectronics

[www.nist.gov/pml/semiconductor/conference](http://www.nist.gov/pml/semiconductor/conference)